

---

---

**Timber structures — Glued laminated  
timber — Assignment of glued  
laminated timber characteristic values  
from laminate properties**

*Structures en bois — Bois lamellé-collé — Valeurs caractéristiques du  
bois lamellé-collé sur la base des propriétés des lamelles*





**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2019

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
CP 401 • Ch. de Blandonnet 8  
CH-1214 Vernier, Geneva  
Phone: +41 22 749 01 11  
Fax: +41 22 749 09 47  
Email: [copyright@iso.org](mailto:copyright@iso.org)  
Website: [www.iso.org](http://www.iso.org)

Published in Switzerland

# Contents

	Page
Foreword .....	v
Introduction .....	vi
<b>1 Scope .....</b>	<b>1</b>
<b>2 Normative references .....</b>	<b>1</b>
<b>3 Terms and definitions .....</b>	<b>1</b>
<b>4 European methodologies .....</b>	<b>1</b>
4.1 General .....	1
4.1.1 Timber .....	1
4.1.2 Related material properties .....	2
4.2 Verification from classification of standardised beam lay-ups and lamination properties of glued laminated timber .....	2
4.2.1 Properties of the boards .....	2
4.2.2 Strength of finger joints .....	3
4.2.3 Beam lay-up and strength class .....	4
4.3 Classification, verification according to method B from cross sectional layup and properties of boards and finger joints .....	6
4.3.1 Properties of the boards .....	6
4.3.2 Strength of finger joints .....	7
4.3.3 Determination of characteristic values for glued laminated timber .....	7
4.4 Verifications from full scale tests with glulam .....	8
4.4.1 Properties of the boards .....	8
4.4.2 Strength of finger joints .....	8
4.4.3 Strength, stiffness and density properties of glulam derived from testing .....	8
4.5 Resawn glulam .....	8
<b>5 US methodologies .....</b>	<b>9</b>
5.1 General .....	9
5.2 ASTM D3737 .....	9
5.2.1 General .....	9
5.2.2 $I_K/I_G$ analysis .....	10
5.3 Tension laminations .....	14
5.4 Volume factor .....	15
5.5 Other glulam properties .....	15
5.6 ANSI A190.1 .....	16
5.7 Performance-based standard .....	16
<b>6 Australian/New Zealand methodologies .....</b>	<b>17</b>
6.1 Direct method .....	17
6.1.1 Tension tests of bonded lamination pairs .....	17
6.1.2 Major axis bending strength of glulam assemblies .....	18
6.1.3 Ratio of glulam beam bending to bonded lamination pair tension strength .....	19
6.1.4 Comparison of glulam assembly bending strength between EN 14080 and Formula (27) values .....	19
6.1.5 Depth and volume effects .....	20
6.1.6 Minor axis properties in bending also known as vertical glulam .....	20
6.1.7 Tension strength .....	21
6.1.8 Shear strength .....	21
6.1.9 Framework of AS/NZS 1328 .....	21
6.2 AS/NZS 1328 .....	21
6.2.1 Standard lamination requirements .....	21
6.2.2 Custom lamination requirements .....	23
6.2.3 Standard glulam and glued structural timber .....	24
6.2.4 Custom glulam and glued structural timber .....	25
6.3 AS/NZS 1328:2017, Appendix B .....	25

6.3.1	Determination of glulam major axis bending strength by computation .....	25
6.3.2	Beam bending stiffness $(EI)_c$ .....	26
6.3.3	Direct method for major axis bending and effective stiffness .....	26
6.3.4	Computer-based Monte Carlo method for bending strength .....	27
6.4	Direct tension and curvature stresses in bending .....	28
6.5	AS/NZS GL grades versus EN 14080 GLh grade bending strength values .....	28
<b>7</b>	<b>Canadian methodologies .....</b>	<b>29</b>
7.1	General .....	29
7.2	Laminating lumber .....	29
7.3	Manufacturing .....	30
7.4	Layup development .....	30
7.4.1	Mechanics-based model .....	30
7.4.2	New layup confirmation by full-scale testing .....	30
7.4.3	Data analysis .....	31
7.5	Acceptance of new layup combinations .....	31
	<b>Bibliography .....</b>	<b>32</b>